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Enhancing The Ability Of Poultry Farming To Cope With Covid-19 Pandemic Using Lora Internet Of Things Technology

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Abstract – Abstract- Since December 2019, the coronavirus disease (COVID-19) epidemic has been pretentious in all sectors of human life. Scientists, as well as engineers, are working for developing a serum, through progressing more testing facilities and to improve monitoring systems. Advanced technology will help to cope with the Covid -19 outbreak and is convenient. In every part of life, it is essential to be updated through ratification of the progress in mass interest. With the growing demand, poultry farming has to cope with Covid -19 pandemic by using Lora IoT technology that becomes well known that contributes enormously to economic growth. In this paper, we will introduce a real-time automated poultry monitoring system that can be very useful to farmers effortlessly access and control the system remotely. The sensor will be used to sense and all data directed collected to the TTN cloud, the data in the cloud can be accessed and controlled by mobile apps, the summary of the information will be sent to the user through a text message or voice messages through handheld mobile devices. This reduces human involvement, saving time, and increases poultry production during the Covid-19 pandemic, in this automated system the physiological parameters such as temperature, air quality level, humidity, light intensity ventilation, and food feeding, in farms needs to be monitored and controlled virtual with less human involvement. The proposed system will generate quality data recording from a sensor that is will be stored in a Network server. The IoT technology will increase poultry fulfillment and raise demand for chicken meat and eggs during the Covid-19 epidemic as well as protection of chicken and the entire system. The strategic intentions of the production are to fulfill human demands and to ensure sustainable agriculture

Keywords – Covid-19, LoRa, IoT, TTN, poultry farm.

I. INTRODUCTION

The Coronavirus disease (COVID-19) pandemic as well as its prevention efforts have created a global health crisis that has pretentious all sectors of human life. With the ongoing progression of time, COVID-19 was confirmed as an outbreak by the World Health Organization (WHO) that will have an extremely high risk possible of affecting millions of people's lives in many countries.

The COVID-19 pandemic has badly obstructed poultry meat production: There has been a 1% reduction in the global chicken meat trade and a 2% decrease in production in 2020 [6]. This decrease is due to lockdowns as well as fluctuations in worldwide poultry feeds. Chicken meat production is predicted to be decreased during the pandemic as a reasonable animal protein supply that is worldwide accepted [7]. However, the COVID-19 pandemic will distress poultry consumption, transport, as well as the economics of poultry farming [5].

The Internet of Things (IoT) is a well-defined scheme of interconnected devices retaining capability in transmission of data over the well-defined network without any human involvement. IoT is now well- established technology for recognizing appliances that help the realistic requirements of human beings that are easily controllable in our daily life using smartphones [1, 2]. As we know in the present situation, the whole world is struggling with COVID-19 and persist in looking for a useful and effective cost solution to aspect the problems arising in several ways. This paper has aimed at providing awareness of this innovative technology in enhancing the ability of poultry farming to cope with the COVID-19 pandemic. In this, paper the implementation of a prototype of poultry as an automated farm system that takes data from sensors and using LoRa gateway to send to the TTN cloud and inform the users about the measures through a mobile device via the application server. An automated poultry farm has been implemented by using a simple IoT board, various actuators, and some sensors and hardware such as IoT board, DHT, MQ-5, MQ-7,

Photoresistors (LDR), Thermocouples, Lora Gateway, and Network server, etc. [3]. The important data obtained from sensors are stored in mobile apps for analysis. The main aim of this prototype is to construct an automated poultry farming to cope with Covid 19 pandemic restrictions. Besides, it integrates many features under one prototype that gives a more efficient and maintainable mechanism control for automated poultry farming [4]. Further, various measures have been provided to farmers as well as the whole system. This paper is organized as follows. Section 2 reviews relevant work. Section 3 details that are proposed by system. Section 4 concludes the work.

II. Related Work

There is significant work in the literature regarding the use of the Internet of Things (IoT) to enhance possibilities of poultry farming.

In [8], this paper author monitors and control poultry farms by using the technology of using a wireless sensor network. In this research, the combination of wireless sensors as well as mobile system networks is applied so that to remotely control and monitor poultry farms.

Author in [9], has proposed poultry farm should be monitored and controlled with the help of Raspberry Pi3 that control and monitor data. Progress of the research was enhanced by having a database for further analysis. In [10] the system they proposed to monitor data stored in the cloud, and then farmers could access the data in real-time in either a computer or smartphone once the threshold of the sensors devices is overdone. In this research, all sensed data are sent to the cloud by using ESP 8266 Wi-Fi module. In [11], their poultry farms are monitored and controlled by using smartphones, and data that were integrated by Arduino UNO are stored remotely in Raspberry pi2. The authors used a fan for controlling humidity and temperature.

In [12], farmers are able to control their poultry farm in a Google spreadsheet, via either webpage or smartphone. They control once they obtain a notification message from the sensors. Moreover, researchers [13], established an automated Environment Controlled Poultry Management System (ECPMS) by using Raspberry Pi as a Linux embedded system board as well as an Arduino UNO board with different sensors. This research has implemented LAMP architecture on a single-board computer (RPI) which consists of a database server and web server. This system reduces the complexity of managing since all servers are integrated on a single-board computer. Researchers in [14] also implemented LAMP server as in [13] but node-MCU (ESP82660) is used for node monitoring where data are collected from different sensors. However, sensor data is stored in MySQL on a web server through Wi-Fi.In [15], a prototype was created by using IoT and WSN technologies.In 2018, the authors that [16] proposed an IoT-based monitoring system in a poultry house by using GSM and GPRS. They just monitored current temperature but they did not develop any controlling system.From the primary research, the functions of poultry farms can be managed automatically, in either smartphones or webpage with the implementation of IoT. In addition, recent researchers have implemented database service, where parameters can also be stored in cloud storage. The purpose of storing data is claimed anonymously for further analysis [10]-[12], [14]-[17]. It has been suggested that the technology can be implemented in poultry farming to sustain and secure. In that case, Lora IoT technology is proposed. The real-time automated poultry system is implemented for monitoring and controlling poultry farms.

III. Proposed Methodology

The working process of the proposed real-time an automated poultry monitoring system is as follows:

1. The model consists of a temperature sensor, air quality sensor, humidity sensor, gas

2. Sensor, water-level sensor, light intensity sensor, IoT board, fan, light, cooler.
3. All the sensors collect data from the environment then pass data in the IoT board and send data to the TTN server through the Lora gateway.
4. Notification will be sent to mobile phones via a mobile application server. The notification is either a text message or audio.
5. Users can automatically control the parameters by using the threshold value for each parameter.
6. The model will be powered by solar and during daytime batteries will store backup power.

The proposed prototype diagram of the system is illustrated in Fig 1

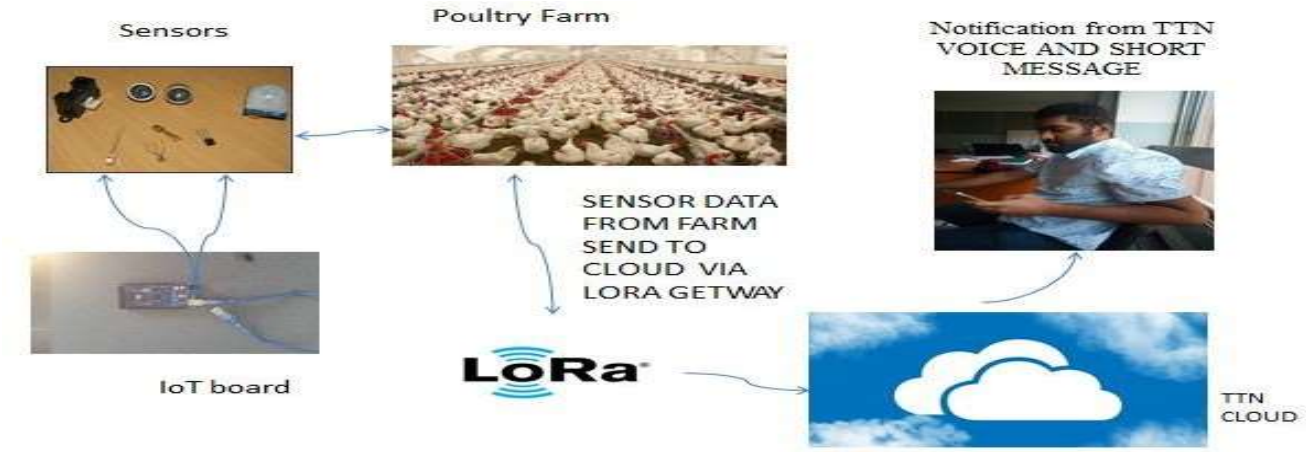

Fig 1. Proposed diagram of the system

IV. CONCLUSION

As we all know that it is important to adopt technology to give service to all sectors of human life. Lora IoT-based solution is needed in acceptable time to get better from poultry farming and to all sectors. The proposed system will generate important data obtained from a sensor that is going to be stored in a Network server. The IoT technology will increase poultry fulfillment, increase demand for chicken meat and eggs during the Covid-19 epidemic together with protection of chicken, and ensure healthy conditions in our poultry farm. The strategic intention of the production is to fulfill human demands to ensure sustainable agriculture. The future works of this system are to analyzed and predict data that has been collected from the farm.

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